Written Statement of the
National Petrochemical & Refiners Association

delivered by
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before the
United States Senate Energy and Natural Resources Committee

concerning
A legislative hearing on the energy market effects of the recently-passed renewable fuel standard.

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Chairman Bingaman, Ranking Member Domenici, and members of the Committee, I am Charles T. Drevna, President of NPRA, the National Petrochemical and Refiners Association. NPRA is a national trade association with more than 450 members, including those who own or operate virtually all U.S. refining capacity, as well as most of the nation's petrochemical manufacturers who supply "building block" chemicals necessary to produce products ranging from pharmaceuticals to fertilizer to Kevlar. I am grateful for the opportunity to share our views on the significant, and unfortunately negative, impacts that the recently enacted renewable fuel standard increase will have on energy markets, consumers and the American economy.

There is universal agreement that alternative fuels will continue to be a strong and growing component of our nation's transportation fuel mix. However, as we have stated on many occasions, including last year before this Committee, NPRA opposes the mandated use of alternative fuels and supports the sensible and workable integration of alternative fuels into the marketplace based on market principles. Energy policy based on mandates is not a recipe for success. There is no free market if every gallon of biofuels – including those that do not exist – is mandated. Mandates distort markets and result in stifled competition and innovation.

Ethanol is currently used in more than half of U.S. gasoline supplies. And despite the misperceptions, our industry supports the use of renewables. In fact, we are currently the largest consumers of ethanol and will continue to rely on ethanol as a vital gasoline blend stock. However, we believe that allowing the market to operate is the best way to address consumer needs at reasonable prices.

Before Congress sent the Energy Independence and Security Act of 2007 (H.R. 6) to the President for his signature, the facts about ethanol mandates and the unintended consequences for both American consumers and the environment were fully disclosed. Unfortunately, these warnings were ignored. A June 2007 GAO report highlighted the higher costs associated with biofuels. Among several findings, the report noted: "According to NREL (National Renewable Energy Laboratory), the overall cost of

transporting ethanol from production plants to fueling stations is estimated to range from 13 cents per gallon to 18 cents per gallon, depending on the distance traveled and the mode of transportation. In contrast, the overall cost of transporting petroleum fuels from refineries to fueling stations is estimated on a nationwide basis to be about 3 to 5 cents per gallon."[1] The dramatic increase in the biofuels mandate under the new law will increase strain on our already congested transportation infrastructure, which could very likely drive the costs of shipping ethanol up even further. In addition to these costs being passed on to consumers, strained transportation avenues could create fuel supply problems.

Transportation challenges, the costs and strains, are only some of the problems associated with dramatically increased mandates of renewable fuels. Ethanol-powered vehicles also have lower fuel efficiency (due to ethanol's lower energy content compared to regular gasoline), as well as limited availability and infrastructure. According to the Department of Energy's Office of Energy Efficiency and Renewable Energy, flex fuel vehicles (FFVs) – cars that can run on either gasoline or a mixture of 85 percent ethanol and 15 percent gasoline (known as E85) – get "about 20-30% fewer miles per gallon when fueled with E85."[2] Given this situation, AAA releases an "E85 MPG/BTU Adjusted Price" in its daily fuel gauge report. It has not been uncommon for this report to show an E85 adjusted price that exceeds the price of a gallon of gasoline by as much as 80 cents.[3]

The limited number of FFVs is also a problem if significantly larger volumes of renewable fuels are to be forced into the market. The only vehicles that can operate on fuel blended with more than 10 percent ethanol (known as "E-10") are flex fuel vehicles. The Alliance for Automobile Manufacturers' website (www.discoveralternatives.org) notes there are currently 11 million alternative fuel vehicles on

[1] U.S. Government Accountability Office, "Biofuels: DOE Lacks a Strategic Approach to Coordinate Increasing Production with Infrastructure Development and Vehicle Needs," GAO-07-713, June 2007, p. 23.
[2] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Fueleconomy.gov, http://www.fueleconomy.gov/feg/flextech.shtml.
[3] For daily price information from AAA, see http://www.fuelgaugereport.com/.

American roads – a small fraction of the 240 million plus vehicles Americans are driving today.[4] The National Ethanol Vehicle Coalition estimates about 6 million of these are FFVs.[5] In addition, over the next several years, automakers have indicated that while they intend to produce more FFVs, they will still be producing gasoline-only vehicles at a rate of about seven or eight to one in relation to FFV production. The new ethanol mandate will most likely require fuel blends in excess of E-10 possibly as early as 2010. However, in addition to existing legacy fleets (e.g. cars that have been purchased up to this point in time that run only on gasoline and won't be retired for several years), there will be a new class of vehicles that may be unable to operate on required fuel blends. This is particularly important given the fact engine and fuel pump makers will not provide warranties for equipment if blends greater than E-10 are used with those products. I will address this in greater detail later in my testimony.

Not only are biofuels more costly and less efficient than gasoline from a fuel supply perspective, but several recent studies and reports reveal biofuels mandates have led to price increases for food and unintended environmental consequences. Several trade associations representing grocers to restaurant owners to cattlemen note how biofuels mandates have dramatically increased the price of corn, making feed for livestock and cattle more expensive. This situation translates directly into higher food prices for American consumers. A FarmEcon.com study noted: "The ethanol subsidy program is now increasing the cost of food production though side effects on major crop prices and plantings. The cost increases are already starting to show up in the prices of meat, poultry, dairy, bread, cereals and many other products made from grains and soybeans."[6] The OECD has also expressed concern over the 'food-vs-fuel' conflict that has arisen from biofuels mandates.[7]

[4] U.S. Department of Transportation, Bureau of Transportation Statistics, "National Transportation Statistics 2007": http://www.bts.gov/publications/national_transportation_statistics/html/table_01_11.html
[5] National Ethanol Vehicle Coalition website: http://www.e85fuel.com/e85101/faqs/number_ffvs.php
[6] Dr. Thomas Elam, *Fuel Ethanol Subsidies: An Economic Perspective*, FarmEcon.com, September 19, 2007, p. 2.
[7] Richard Doornbosch and Ronald Steenblik, *Biofuels: Is The Cure Worse Than The Disease?*, Organisation for Economic Co-operation and Development , September 2007.

In addition to food price and supply effects, other recent studies have noted the negative impacts biofuels mandates are having on the environment. An Environmental Defense report revealed how a dramatic increase in ethanol plants is draining the Ogallala Aquifer, which stretches from Texas to Wyoming.[8] The National Academy of Sciences has also written a report on the negative water supply impacts of increased biofuels production.[9] Press reports from last year described how an increase in farm waste from the corn boom flowing into the Mississippi River has created an area off the Louisiana coast where shrimp and other sea life cannot survive.[10] Finally, several scientists say dramatically increased biofuels production may significantly increase greenhouse gas emissions. Nobel Prize winner Paul Crutzen concluded increased biofuels production is accompanied with a dramatic increase of nitrous oxide (N2O) emissions, which have nearly 300 times greater warming potential than CO2.[11] The European Union recently passed a law that may essentially ban certain biofuels due to environmental impacts.[12]

While many point to cellulosic ethanol as a potential solution to these problems, that particular fuel poses its own set of challenges. Cellulosic ethanol technology is still very costly and is not commercially available – let alone produced at levels adequate to meet the new mandates in the new energy law. Early last year, the Energy Information Administration noted, "Capital costs for a first-of-a-kind cellulosic ethanol plant with a capacity of 50 million gallon per year are estimated by one leading producer to be $375 million (2005 dollars), as compared with $67 million for a corn-based plant of similar size, and investment risk is high for a large-scale cellulosic ethanol production facility."[13] The report noted that given those costs, no cellulosic plant had been built or was in operation at that time (February 2007). At

[8] Martha G. Roberts, Timothy D. Male, Theodore P. Toombs, "Potential Impacts of Biofuels Expansion on Natural Resources: A Case Study of the Ogallala Aquifer Region," Environmental Defense, October 2007.
[9] National Academy of Sciences, "Report in Brief: Water Implications of Biofuels Production in the United States," October 2007
[10] Tony Cox, "Ethanol Demand Seen Harming U.S. Fishermen," Bloomberg, July 23, 2007
[11] P. J. Crutzen, A. R. Mosier, K. A. Smith, and W. Winiwarter, "N2O Release from Agro-Biofuel Production Negates Global Warming Reduction by Replacing Fossil Fuels," Atmospheric Chemistry and Physics Discussions, August 1, 2007.
[12] John W. Miller, "EU is Planning Measures to Protect Biofuels Industry," January 23, 2008, P.A11.
[13] U.S. Energy Information Administration, "Biofuels in the U.S. Transportation Sector," February 2007: http://www.eia.doe.gov/oiaf/analysispaper/biomass.html

that same time last year, the Department of Energy announced they were allocating $385 million to help fund six cellulosic ethanol plants that would produce about 130 million gallons annually, but it is highly unlikely those plants will be producing at full capacity in time to meet the new law's 2010 mandate of 100 million gallons, and will not produce enough for the 250 million gallon target for 2011.[14]

The Energy Policy Act of 2005 included a cellulosic ethanol mandate of 250 million gallons starting in 2013. The Food and Agriculture Policy Research Institute (FAPRI), however, projects only about 213 million gallons of cellulosic may be produced in that year.[15] This adds little support to the argument that a mandate will drive the technology and economics of producing a certain product. As previously mentioned, the new energy law mandates 100 million gallons of cellulosic in 2010 – less than two years from now. FAPRI's estimate on cellulosic production for that year is only 27 million gallons – 27 percent of what is required in the law. That's a lot of ground to make up in a short time frame. Failure to meet these figures will prevent refiners from complying with the law, leading not only to cost increases from unavoidable and onerous financial penalties, but potentially creating significant supply shortages.

The new energy law calls for a Renewable Fuels Standard with not one but four different mandates that will equal 36 billion gallons by 2022. It requires that 9 billion gallons of renewable fuel be blended into the transportation fuel supply *this year*, ratcheting up to 36 billion gallons in 2022. In addition, it contains three other subset mandates: an "advanced biofuel" requirement of 600 million gallons in 2009, scaling up to 21 billion gallons in 2022; a specific cellulosic biofuel mandate of 100 million gallons in 2010, ratcheting up to 16 billion gallons in 2022; and a biodiesel mandate of 500 million gallons in 2009 moving up to 1 billion gallons in 2012. Each of these fuels has to reach certain carbon reduction targets. We understand that this is the law of the land and you have the commitment of the domestic refining industry that we will do our very best to comply. However, this mandate will have significant detrimental effects to

[14] Wong, Jetta, "U.S. Bioenergy Policies: What is Currently Being Done and What Needs to be Done?", Environmental & Energy Study Institute, May 8, 2007, p. 13: http://www.eesi.org/publications/Presentations/2007/jw_swedish_5-8-07.pdf
[15] Food and Agricultural Policy Research Institute, "World Biofuels: FAPRI 2007 Agricultural Outlook," p. 319.

our country and its consumers that extend beyond what could be accomplished through any sort of legislative change short of repeal.

The Petroleum Industry Faces Compliance Problems Now

The Energy Policy Act of 2005 created the first mandatory Renewable Fuel Standard (referred to as RFS1 later in this testimony). It required 7.5 billion gallons of ethanol to be blended into our nation's fuel supply by 2012, with refiners responsible for showing compliance with the mandate through a credit program. EPA promulgated comprehensive regulations (72 FR 23900; 5/1/07) implementing this law and the regulatory program began on September 1, 2007. It requires that the mandated volumes of renewable fuels for the appropriate compliance year (i.e. ethanol and biodiesel) be used in transportation fuel supply through a credit trading and banking program. EPA created an averaging program with a calendar year compliance period that stipulates what percentage of RFS credits refiners must hand over in relation to their contribution to our country's fuel supply in order to comply with the law.

The new energy bill requires 9.0 billion gallons of renewable fuels in 2008. Assume hypothetically for the moment that 12 billion gallons of renewable fuels *actually will* be produced and imported in 2008 (at best a problematic assumption). This does not help a refiner's RFS compliance in 2008 unless at least 9.0 billion gallons is actually blended in gasoline or diesel. It is most doubtful there is enough infrastructure available for that to happen.

Gasoline is a hydrocarbon. When gasoline is combusted in a vehicle, a portion of the exhaust emissions that come from the tailpipe consist of hydrocarbons. Hydrocarbon emissions also evaporate from a vehicle's gasoline tank on a hot day. Such emissions are a precursor to the formation of ground-level ozone, or smog. One strategy to reduce ozone concentrations is to limit hydrocarbon emissions from the combustion of gasoline. This can be accomplished by a maximum standard on the Reid vapor pressure (RVP) of summer gasoline. RVP is an indicator of gasoline's volatility. Lower RVP reduces

gasoline's hydrocarbon emissions. Summer RVP standards are usually a per-gallon maximum 9.0, 7.8, or 7.0 pounds per square inch (psi). EPA and states have controlled summer gasoline RVP for over 15 years.

When ethanol is added to gasoline, the gasohol blend has a higher RVP than gasoline without ethanol. Therefore, adding ethanol to gasoline can exceed RVP limits. Section 211(h)(4) of the Clean Air Act provides a 1 psi RVP waiver (i.e. fuel blends can be 1 psi higher than the applicable maximum 9.0, 7.8, or 7.0 psi) for conventional gasoline with 9-10 vol% ethanol. This means that gasohol can exceed the applicable RVP limit by 1 psi if the blend contains between 9 and 10 vol% ethanol, leading to the formation of more smog-creating emissions.

If a delivery truck pulls up to a retail station in the summer with a load of gasohol (E10 – 10 percent ethanol, 90 percent gasoline) and the underground retail tank has had no E10 deliveries before, then the RVP regulation may be violated because the retail tank would have less than 9 vol% ethanol (the average of summer conventional gasoline without ethanol still in the tank and the new delivery of E10 could result in less than E9 after the new delivery). Therefore, if the retail station starts the summer with conventional gasoline without any ethanol, it cannot convert to E10 until the summer season ends and the summer RVP regulation does not apply. This obviously constrains the conversion of conventional gasoline retail stations to E10 this summer.

As previously noted, the RFS program includes credit banking and trading. RFS credits are called renewable identification numbers (RINs). Each volume of renewable fuel produced is assigned a RIN that is separated from that physical volume when it is blended into the fuel supply. Refiners then buy that RIN credit from the terminal doing the blending and use it for RFS compliance. Sometimes refineries detach the credits themselves if they blend ethanol onsite (which only happens for an extremely small percentage of the fuel supply) or if they own the terminal doing the blending (which isn't always the case). RINs

cannot be used for compliance by a refiner until it is detached from a barrel of ethanol or biodiesel (usually when it is blended with gasoline or diesel).

One RFS compliance option for refiners in 2008 is carryover of a 2008 RFS deficit to 2009. However, that refiner cannot carry over a deficit for two consecutive years (see Clean Air Act section 211(o)(5)(D), inserted by the Energy Policy Act of 2005, and RFS1 regulations at 40 CFR 80.1127(b)). It is not clear that that refiners can fully comply in 2009 with 2009 RINs and purchase additional RINs in 2009 to also meet its RFS deficit for 2008. The RIN supply in 2009 may not be large enough. Lots of ethanol may be produced and imported in 2009, but not all of it may be blended in gasoline in 2009 and release RINs that be used by a refiner to demonstrate compliance.

Certainly it is possible that some refiners will meet their RFS obligation in 2008 without a deficit carryover. However, it is unlikely that all refiners will meet their RFS obligation in 2008 without one. It may also be unlikely that all refiners will be able to meet out year obligations given the limitations on deficit carryovers.

RINs Could Be Invalidated by EPA

Section 202(a)(1) of H.R. 6 states: ". . . *and, in the case of any such renewable fuel produced from new facilities that commence construction after the date of enactment of this sentence, achieves at least a 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions."* This is repeated in section 210(a)(1) with explicit guidance for this year: *"For calendar year 2008, transportation fuel sold or introduced into commerce in the United States (except in noncontiguous States or territories), that is produced from facilities that commence construction after the date of enactment of this Act shall be treated as renewable fuel within the meaning of section 211(o) of the Clean Air Act only if it achieves at least a 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions."*

These two legislative provisions raise doubts about the validity of RINs generated by plants that commence construction after enactment in December 2007. That new facility will produce ethanol or biodiesel with RINs that could be declared later by EPA as invalid because the new facility does not comply with EPA's new RFS rules (not yet promulgated and hereafter referred to as RFS2) to implement these legislative provisions. The refiner is required by the existing RFS regulations (hereafter referred to as RFS1) at 40 CFR 80.1131 to replace invalid RINs with valid RINs, "regardless of the party's good faith belief that the RINs were valid at the time they were acquired." The existing provision relating to RIN validity and lack of clarification on whether or not RINs will be good under RFS2 will contribute to market instability this year because of the lack of certainty that all RINs are valid.

Section 210(a)(1) states: *"For calendar years 2008 and 2009, any ethanol plant that is fired with natural gas, biomass, or any combination thereof is deemed to be in compliance with such 20 percent reduction requirement and with the 20 percent reduction requirement of section 211(o)(1) of the Clean Air Act. The terms used in this subsection shall have the same meaning as provided in the amendment made by this Act to section 211(o) of the Clean Air Act."* This does not apply to new biodiesel plants. Furthermore, this legislative provision ensures that new ethanol plants "fired with natural gas, biomass, or any combination thereof is deemed to be in compliance" in 2008 and 2009, but does not guarantee that they will be in compliance after 2009. Therefore, this legislative provision also creates the possibility that RINs from new plants could be declared invalid later by EPA.

This uncertainty will contribute to RIN market instability this year and in out years because of the lack of assurance that all RINs are valid.

Market Speculators Could Adversely Influence RIN Supplies

Given the lack of supply, infrastructure and the mandate's aggressive schedule, the RIN market will be extremely tight this year and for the foreseeable future, creating more impetus for speculators to try to profit through creating RIN scarcity. Such an occurrence could contribute to an increase in RIN prices and impact prices consumers pay at the pump.

In 40 CFR 80.1128(b) of the RFS1 regulations, EPA permits any party that has registered with the Agency to hold title to an unassigned RIN. Therefore, a speculator who is not a RFS obligated party can buy RINs for later resale. This situation could take RINs off the market for a while and contribute to perceptions of short-term RIN shortages. In other words, speculators could hoard RINs for the sole purpose of trying to drive up their price.

New Cellulosic Biofuel Waiver Provisions Provide for Last-Minute Regulatory Changes

The new energy law added a waiver provision for cellulosic biofuel (see Clean Air Act section 211(o)(7)(D)). EPA can reduce the applicable regulatory volume of cellulosic biofuel if the projected volume is expected to be lower than the statutory volume. If the Agency makes this decision, then it must notify obligated parties "not later than November 30 of the preceding calendar year." In addition, *"For any calendar year in which the Administrator makes such a reduction, the Administrator may also reduce the applicable volume of renewable fuel and advanced biofuels requirement established under paragraph (2)(B) by the same or a lesser volume."*

The provision, as currently written, obviously does not give RFS obligated parties much lead time for compliance planning. They may not have more than 30 days notice of what the final regulatory volumes will be for the following calendar year.

Promoting "on ramps" is a preferable approach to this sort of policy; where the Administration promulgates a short-term regulatory forecast with a high degree of confidence and sets a mandate level two years out according to that projection. A few years later, the Administration promulgates another

short-term regulatory forecast with a high degree of confidence and sets out year mandates accordingly. In this case, the Administration does not have to reduce the regulatory targets with an "off ramp," while still achieving the goal of promoting alternative fuels and maintaining market stability. Such a policy provides regulatory and market certainty. It allows for an honest assessment of logical options. It will not limit the amount of renewable fuels available, but rather ensure all renewables that actually exist will be used while preventing a situation where refiners are faced with the choice of using something that is not available or paying a hefty penalty.

The New RFS Mandate Will Require Mid-Level Ethanol Blends, But There Are Several Barriers and Problems Associated with Getting These Blends Into the Marketplace and Consumers' Ability to Use Them

As previously mentioned, the large volumes of renewable fuels mandated in the recently enacted HR 6 will essentially force fuel blends greater than E-10 (10 percent ethanol, 90 percent gasoline) into our nation's gasoline supply. Preliminary industry analysis indicates these blends may need to be produced to meet the mandate by as early as 2010 – less than two years away. The only vehicles capable of running such blends are E-85 vehicles. As discussed earlier, these vehicles represent only 6 million out of over 240 million registered vehicles on the road. The rest of the gasoline-only vehicles currently in the marketplace, and the approximately 16 million that will be produced annually over the next several years, cannot run on blends greater than E-10. The corrosive nature of ethanol eats away at automotive pipes and creates engine problems in these vehicles. In order for blends between E-10 and E-85 (i.e. blended gasoline that contains somewhere between 10 and 85 percent ethanol, called "mid-level ethanol blends") to be viable in the fuel supply, automakers will have to certify that cars can run on these blends and warrantee those vehicles.

Ethanol infrastructure presents another barrier to RFS implementation. Existing fuel pumps and underground tanks cannot accommodate fuel blends greater than E-10 for reasons similar to those relating

to cars. In order for the volumes of renewable fuels mandated in the new energy law to make it into the market place, tank and pump makers have to certify and provide warranties for all the equipment needed to handle mid-level ethanol blends. This could be a timely process and the new mandate schedule fails to provide the market with that sort of time. Without certification and warrantees, the infrastructure to accommodate mid-level ethanol blends won't get built. Refiners may then may find themselves in a situation where they won't be able to comply with the law because of their inability to blend the requisite volumes of renewable fuels into the fuel supply. This could create a significant number of supply problems.

The Primary RFS Compliance Fuels, Biodiesel and Ethanol, May Contribute to Increases in Ozone Levels (Smog) During the Summer

EPA has concluded that biodiesel increases NOx emissions and reduces fuel economy because of its lower energy content. See http://www.epa.gov/otaq/models/analysis/biodsl/p02001.pdf. This will be a problem because NOx emissions are a ground-level ozone precursor.

As previously discussed, ethanol increases the Reid vapor pressure (RVP) of the fuel. Higher ethanol blends results in higher volatile organic compound (VOC) emissions, another ozone precursor, in the summer months. Also, given that the upcoming revised 8-hour ozone National Ambient Air Quality Standards (NAAQS) could result in many new ozone non-attainment areas, it is unlikely that the mandated level of ethanol can be distributed in summer 9.0 psi RVP conventional gasoline areas without exacerbating ozone problems in non-attainment areas or creating new non-attainment areas. The expansion of non-attainment areas will impose constraints on the usage of ethanol that will result in increased costs because the distribution system will be pushed away from the low-cost solution. These additional costs will be borne by consumers. In addition, the de facto result of expanding non-attainment areas is the creation of a significant conflict between NAAQS and the new RFS.

Congress Should Suspend the Tariff on Imported Ethanol

Given the problems discussed above and the significant strain on our nation's fuel supply system associated with the dramatically increased ethanol mandate in HR 6, Congress should suspend the tariff on imported ethanol in order to maximize the supply of renewable fuels. This is not a new position for NPRA; NPRA advocated this position in testimony before the Senate Commerce, Science, and Transportation Committee in May 2006. Removing the tariff is critical to providing refiners more flexibility that will be desperately needed to comply with the newly expanded ethanol mandate.

Conclusion

NPRA members are dedicated to working cooperatively at all levels to ensure an adequate supply of clean, reliable and affordable transportation fuels. We stand ready to work with the Senate and House to ensure a stable and effective fuels policy that utilizes a diversity of resources to improve our national security, assist our consumers and protect our environment. As my testimony indicates, the new RFS creates several problems in the fuels marketplace – many of which may be insurmountable. In addition to consumer impacts, backlash from potential negative impacts of this law could ultimately end up threatening the availability of alternative fuels in the marketplace. I appreciate this opportunity to testify today and welcome your questions.